UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

07 OCT 1987

M. G. Mefferd
State Oil and Gas Supervisor
California Division of Oil and Gas
1416 9th Street, Room 1310
Sacramento, CA 95814

Dear Mr. Mefferd:

Enclosed with this letter is a signed original of the FY88 Oversight Agreement. This agreement, along with the grant work plan and Memorandum of Agreement, represents the Enforcement Agreement for FY88. The Oversight Agreement will be in effect for the federal fiscal year 1988. Changes may be made upon agreement by both parties.

If you have any questions on the agreement, please feel free to call Mark Samolis, CDOG Program Manager, at (415) 974-0747. We look forward to continuing our good working relationship in the administration of the Class II underground injection control program.

Sincerely,

Harry Seraydarian
Director, Water Management Division

FISCAL YEAR 1988
UIC OVERSIGHT AGREEMENT
California Division of Oil and Gas / U.S. Environmental Protection Agency

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PART ONE - Oversight Strategy

I. Introduction

A. Background

Following delegation of the Underground Injection Control (UIC) program to a State, the U.S. Environmental Protection Agency (EPA) remains responsible and accountable to the President, Congress, and the public for progress toward national UIC goals. Consequently, EPA's role becomes one of oversight and assistance.

The basis for oversight of a State's program is regulatory in nature. 40 CFR Parts 30, 35, and 144 set forth grant and UIC programmatic requirements. Part 30 requires the State to submit financial status reports and property reports at the end of each grant period. Part 35 requires the Program Managers to provide guidance to the State regarding programmatic priorities and goals. It also covers evaluation of the State's performance. Part 144 requires the submission of annual program reports and non-compliance reports. In conducting oversight activities, EPA will utilize information resulting from these existing reporting and evaluation requirements as much as possible to minimize the burden on or disruption of the State's implementation of the program. This oversight strategy is based on the applicable regulations; EPA issued guidance [Ruckelshaus's Policy Memo (4/4/84), Revision to Ground Water Program Guidance #30 (2/19/85), Policy on Performance-Based Assistance (5/31/85), UIC Program Guidance #40 (6/28/85), and draft UIC Program Guidance on FY-87 UIC Enforcement Agreements (6/12/86)]; and past experience in oversight. If not otherwise specified herein, national policy will apply.

B. Oversight Goals

The goals of this oversight strategy are as follows:

1. to ensure and document that the State is implementing the UIC program in accordance with the requirements of the Safe Drinking Water Act and provisions of the State's primacy application;

2. to collect information that will allow EPA to assess nationally, the effectiveness of the UIC program;

3. to ensure proper grants management; and

4. to provide effective and efficient assistance (technical, financial, and legal) to the State.

For oversight to be most effective, it is important that the EPA and State have a mutual understanding of the oversight process and criteria for evaluation. Therefore, EPA will negotiate an oversight agreement prior to the awarding of the next fiscal year grant. This agreement will set forth the criteria, procedures, and schedule to be used by EPA to evaluate the State's implementation and management of the UIC program. The oversight agreement can be incorporated into the State Memorandum of Agreement, the grant agreement, or be set forth as a separate document depending on the preference of the State and EPA. EPA will designate a person as Program Manager for each delegated State. Depending on resources, that person may oversee one or more States. The Program Manager has lead responsiblity for oversight of the primacy State and will serve as the lead contact between the State and EPA for the UIC program.

II. Elements of Oversight

A. Agreement

The oversight agreement will be drafted by EPA and sent to the State prior to the awarding of the next fiscal year grant. It will be negotiated and agreed to by the State and EPA on or before September 30 of each year, if possible. As mentioned above, the agreement document may take a variety of forms, but it will include:

1. criteria and measures EPA will use for evaluation,
2. oversight events that will take place, and
3. a general schedule for those events.

The logistics of the oversight events may not be spelled out in the oversight agreement, but will be clarified by letter at least two weeks before the planned events.

B. State Reporting Requirements

1. Grant Reports - EPA will consider information submitted in required reports when evaluating the implementation of the State program. As mentioned in Section I. A. of this document, the State must submit a Financial Status Report and a Report on Federally-Owned Property (inventory on property and its condition) at the end of each grant period [40 CFR 30.505(b) and (d)].

2. Quarterly UIC Reports - The UIC report forms (Form 7520 Parts I, II, III, IV, and V) will be submitted quarterly to the Regional Program Manager. They will be submitted within one month after the end of the quarter. The first quarter will begin on October 1, 1987. The information on these reports will be cumulative. In other words, the fourth quarter report will be equivalent to the annual report for the past year. By aggregating annual report data from all States (and Direct Implementation programs), EPA will be able to calculate and document the nationwide level of activity in the UIC program. This information has and will be used by EPA to establish a tracking and evaluation system for the program.

3. Inventory Update - The injection well inventory update is required by 40 CFR Part 144.8(b)(2)(i), and is due by November 30 of each year. However, the State should submit it earlier to facilitate processing and entry into the national data base by October 31 of each year.

C. Monitoring of State Activities

The Program Manager will maintain frequent contact with State UIC staff through phone calls and visits. Other EPA staff will be involved with the State as issues dictate. The Program Manager may perform all of the following activities, but will at a minimum perform one file review each year.

1. File Reviews - The Program Manager will utilize a review of the State's files to assess permitting, compliance, and enforcement performance. This review may be done in random fashion, or may concentrate on permits or actions in a certain geographic area or geologic formation or on a certain well class. These reviews will be done in advance of the midyear and end-of-year evaluation conferences (discussed in Sections III. A. and B. of this document). The Program Manager will negotiate with the State on dates for these reviews, the area to be reviewed, and the size and type of file sample to be reviewed.

2. "Real Time" Reviews - If necessary, the Program Manager may review draft permits and enforcement actions prior to their release or within the normal public comment periods. This would not be a veto exercise, but a mechanism for overseeing the process as it takes place. This approach would probably be used to a very limited extent for a Class II program.

3. Quarterly Meetings - These meetings may be held, as necessary, to determine the State's compliance with program requirements. They will be less formal than midyear or end-of-year evaluation conferences and may be held in the District offices, the State's main office, or the field.

4. Inspection Audits - The Program Manager and/or an EPA inspector may evaluate the State's compliance activity by accompanying State inspectors as they do their field work (routine inspections, witnessing MIT's, plugging, or construction). If EPA accompanies the State on such inspections, the Program Manager will coordinate with the State and will conform to the State's schedule.

5. Attend Public Meetings - After notifying the State, EPA may attend public hearings or meetings to observe the State's public participation practices. The EPA may also attend meetings of State Boards, Commissions, etc., if necessary.

D. Evaluation Conferences

EPA will conduct a midyear and end-of-year evaluation conference with the State at its offices. The basis, criteria, and schedule for these conferences is described in Section III.

Continuous and frequent contact with the State will allow the Program Manager to provide feedback and technical assistance to the State. This contact will also allow the Program Manager to more effectively perform the midyear and end-of-year evaluations.

III. Goals, Mechnanics, and Criteria for Evaluation Conferences

A. Goals

The midyear and end-of-year evaluation conferences will be conducted:

1. to determine the State's performance against commitments during the current budget period,

2. to identify any changes which should be made to the State's work plan for the remainder of the budget period or for the next fiscal year, and

3. to provide feedback to EPA on our effectiveness in overseeing and assisting the State.

B. Mechanics

A midyear evaluation conference will be conducted in about April of each year (or the middle of the budget period). The conference with State UIC staff will be conducted at the State agency office by EPA's Program Manager. Depending on the issues slated for discussion, other EPA staff may attend the conference. Following the conference and any other on-site activities involved with the evaluation, the EPA representative(s) will conduct an "exit conference" with the State agency director or other appropriate State agency officials (unless those officials attended the evaluation conference).

Following the conference, EPA will draft a midyear evaluation report which summarizes EPA's evaluation of the State's performance. This report will be sent to the State in draft form within three weeks of the conference. The State will review the draft report and transmit comments to EPA within three weeks of receipt. EPA will finalize the report and forward it to the State within two weeks of receipt of the State's comments.

An end-of-year evaluation conference will be conducted, depending on resources, during the month following the close of the fiscal year (or budget period). EPA will conduct the end-of-year conference with the State UIC staff at the State offices. As with the midyear conference, the end-of-year conference will be led by the EPA Program Manager with attendance by other EPA officials, as appropriate. An "exit conference" will be held with State agency officials. Following the conference, EPA will draft an end-of-year evaluation report which will summarize EPA's evaluation of the State's performance during the budget period. EPA will send this report to the State in draft form within three weeks of the conference. The State will review the draft report and transmit comments to EPA within three weeks of receipt. EPA will finalize the report and forward it to the State within two weeks of receipt of the comments.

For both the midyear and end-of-year conferences, the State attendees will be suggested by EPA, but the State will decide on their inclusion. The purpose of the "exit conference" is to apprise the State of EPA's preliminary assessment and major issues that may have been identified.

The format for the midyear and end-of-year reports will, at a minimum, include three major parts:

I. Summary of Strengths, Concerns, and Follow-Up Issues
II. Background
III. Discussion by Program Element (see grant work plan and Section III. C. for these elements)

C. Criteria for Midyear and End-of-Year Evaluations

To evaluate the State's implementation and management of the UIC program it is necessary to have a basis for expectation and comparison against which the evaluation can be made. The basis is found in the following documents which the Program Manager will review and reference in evaluating the State's performance.

1. Memorandum of Agreement - EPA will assess whether the State has complied with the procedures and commitments set forth in this agreement and assess the need for change.

2. Program Description - EPA will evaluate whether the State's program is being implemented and managed as outlined in this document, which was a part of the primacy application.

3. State Regulations - EPA will check to ensure that the State's actions are in accordance with the State's UIC regulations.

4. Grant Work Plan - EPA will compare the State's accomplishments with the program of work set forth in the UIC program grant work plan for the budget period.

5. Grant Award Document - EPA will also reference the budget and grant conditions of the UIC grant award document for the current budget period in evaluating the State's performance.

6. Prior Evaluation Reports - EPA will review these reports to determine if the State has implemented the recommendations from the previous evaluations.

7. EPA Operating Guidance - EPA will compare State objectives with the national and regional program priorities set forth in this document.

8. EPA Quarterly UIC Reports - EPA will review these reports to determine how the State is performing relative to its program commitments.

The following general areas may be reviewed by the EPA during program evaluations to determine the effectiveness of the State's program. These areas are not only topics that may warrant discussion at the evaluation conferences, but are areas that will be considered throughout the oversight process.

8. Programmatic/Technical Elements

a. Permitting Process

(1) Quality of Permits
- Are technical judgments of good quality?
- Do construction and operation requirements conform with the documents in Section III. C. of this document?
- Are requirements clear and enforceable?

(2) Accomplishments vs. Projections
- Is permit issuance on schedule?
- Is review of existing well records on schedule?

(3) Administrative Efficiency
- Does the permitting process need to be streamlined?
- Does the review of existing well records need to be addressed?

(4) Public Participation
- How well does the State respond to public comments on proposed permits?
- Are public notice and participation processes adequate?

(5) Exceptions
- If the State allows exceptions to permitting requirements, are they done according to regulation and in a way that protects underground sources of drinking water?

b. Compliance Actions

(1) Inspections
- What is the quality and extent of inspections?
- Is there a written and reviewable inspection strategy?

(2) Response to Complaints
- Does the State respond quickly to complaints from the public?

(3) Accomplishments vs. Projections
- Were the expected percentages of MIT's, pluggings, and other tests witnessed?
- Are the number of inspections on schedule?

(4) Review of Operator Reports
- Did the State review operator reports for compliance with the permit conditions, and were appropriate actions taken when necessary?

(5) Assistance to Operators
- Does the State respond quickly to requests for assistance from operators?

c. Enforcement Actions

(1) Timeliness
- Were enforcement actions initiated in a "timely and appropriate" manner?

(2) Effectiveness
- Did the actions chosen by the State resolve the problem?
- Is progress being made on bringing all wells with significant non-compliances (if any) into compliance?

(3) Adequacy
- Were the actions taken appropriate for the event?
- Is there a clear plan or strategy for how and when sanctions or penalties are used in the enforcement program?
- Were penalties sought or assessed appropriate?
- For each penalty sought, is there a documented rationale, accurate recordkeeping, and tracking?

(4) Emergency Response
- Did the State respond timely and appropriately in these events?

(5) State Attorney General (AG) Involvement
- Is there a mechanism in place so that the State AG is properly notified and consulted about planned Federal enforcement actions, legal resources, enforcement commitments to EPA, and timing of negotiations with EPA?
- Is it necessary for EPA to establish direct communications with the State AG?

(6) Federal Intervention
- Is it necessary for EPA to become directly involved in any enforcement action?

9. Administrative Elements

a. Program Coordination

(1) Within CDOG
(2) With EPA
(3) With Other State Agencies
(4) With Clean Water Act programs
(5) With Comprehensive Environmental Response Compensation and Liability Act (Superfund) and Resource Conservation and Recovery Act programs

b. Regulation Revision

(1) State Response to Changes in EPA UIC Regulations
(2) State Notification to EPA of Proposed Changes to States Regulations

c. Grant Requirements

(1) Adequacy of Property Management
(2) Submission of Financial Status Reports
(3) Compliance with Audit Requirements
(4) Compliance with Special Conditions

d. Resource Utilization

(1) Adequate Staffing
(2) Use of UIC monies

e. Training

(1) Staff Needs Identified
(2) Events Held or Attended by State

f. Special Studies/Contracts

(1) On Target with Schedule
(2) Contract Management

g. Data Management

(1) Maintenance of an Updated Well Inventory
(2) Timely and Accurate Submission of Reports and Inventory Updates to EPA
(3) Reporting of Significant Non-compliances and Wells on the Exceptions List

PART TWO - Program Manager's FY88 Oversight Work Plan for CDOG

The goals and activities outlined in the Oversight Strategy can be consolidated into three general topics: oversight of the State's UIC program, proper grants administration, and assistance to the State.

I. Work Plan

A. Oversight of the State's UIC Program

Activities	Estimated Date
Send agenda for FY87 end-of-year evaluation conference to CDOG	10/16/87
Hold FY87 end-of-year evaluation conference with CDOG in Sacramento office	10/30/87
Assure that CDOG submits inventory update by November 30	10/30/87
Determine with CDOG date and place for midyear field office audits	03/88
Conduct midyear field office audit at one large District office (includes review by EPA inspector of CDOG compliance inspections)	03-04/88
Send agenda to CDOG for FY88 midyear evaluation conference	04/88
Hold FY88 midyear evaluation conference with CDOG	04/88
Prepare and finalize FY88 midyear evaluation report	06/88
Determine with CDOG date(s) and place(s) for end-of-year field office audit	08/88
Conduct end-of-year field office audit at District offices (includes review by EPA inspector of CDOG compliance inspections)	08/88
Send agenda to CDOG for FY88 end-of-year evaluation conference	10/88
Conduct FY88 end-of--year evaluation conference with CDOG	10/88
Negotiate oversight/enforcement agreement for FY89	09/88
Implement oversight/enforcement agreement for FY89	10/88
Attend public hearings, as appropriate	If Held
Assure that CDOG completes the number of inspections, permit determinations, and MITs committed to in the FY88 SPMS and grant work plan	Ongoing
Take EPA action against a CDOG SNC violation, if the Division fails to take appropriate action after one quarter following the quarter in which the violation was identified.	Ongoing

B. Proper Grants Administration
(This will be done in conjunction with the Grants Administration Section.)

Activities	Estimated Date
Monitor grant expenditures vs. products	
1. Review of Financial Status Report	01/88
2. Questions during end-of-year and midyear	10/87 04/88
3. Contacts with CDOG	Ongoing
Provide guidance to State on FY89 program priorities to initiate FY89 grant work plan development	06/88
Begin discussion of FY89 grant work plan	06/88
Draft FY89 grant work plan received by EPA UIC Section	07/01/88
Review work plan and relay comments to State and hold final negotiations	07/15/88
Receive and initiate processing of final FY89 grant application	08/01/88
Keep State apprised of fund allocations	Ongoing

C. Provide Assistance to CDOG

Activities	Estimated Date
Review new aquifer exemption requests (after regional aquifer exemption criteria guidance has been established)	Within 60 Days
Review previously submitted aquifer exemption requests	1st Quarter
Coordinate with CDOG on the reclassification and permitting of wells which inject air scrubber wastes and water softener regeneration brines	1st Quarter
Provide briefing to Department of Conservation administrative staff regarding grant requirements and timeframe	4th Quarter
Notify CDOG of training opportunities and national meetings	Ongoing
Respond to citizen complaints that may be received by EPA	As Needed
Assist State with program revisions	As Needed
Determine need for coordination between CDOG and other State agencies if other agencies seek primacy	As Needed
Assist CDOG with implementation of quality assurance procedures	As Needed

II. Signatures of Agreement

This Oversight Agreement document represents an agreement between the U.S. Environmental Protection Agency, Region 9 (EPA), and the California Division of Oil and Gas (CDOG) regarding EPA's oversight of the CDOG in its role as primary enforcement authority for the Underground Injection Control program under the Safe Drinking Water Act. It describes the oversight criteria, measures, procedures, and protocol for FY88. If any events in the Program Manager's work plan need to be changed, those changes will be made by agreement between the EPA and CDOG. This agreement, and any changes to the work plan that may be agreed to during the year, will be in effect for the Federal fiscal year 1988.

10-13-1987
Date

M. G. MEFFERD
State Oil and Gas Supervisor
California Division of Oil and Gas

10/6/87
Date

HARRY SERAYDARIAN
Director, Water Management Division
U.S. Environmental Protection Agency
Region 9

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

26 MAR 1987

In reply
Refer to: W-6-2

Hal Bopp
California Division of Oil and Gas
4800 Stockdale Highway, Suite 417
Bakersfield, CA 93309

Dear Hal:

As part of the annual midyear evaluation, I and Dave Kyllonen from Region 9 will be visiting the Bakersfield District office on March 30-April 1. We will be conducting file reviews and technical evaluations to assess the California Division of Oil and Gas (CDOG) permitting and enforcement activities in implementing the Underground Injection Control (UIC) Class II Program. This review is a part of our routine State oversight activity.

I am enclosing the checklists that will be used during the review. Two of them are based on the procedures and requirements described in CDOG's primacy application. There is also a new technical checklist that has been developed. It is fairly comprehensive, and some of the items may not be applicable to CDOG's program. It is intended to be used as a guideline for reviewing and evaluating the technical aspect of CDOG's UIC activities.

As we discussed over the phone, we will be looking specifically at the DE&O, Texaco Red Ribbon, and Valley Waste disposal projects. We would also like you to select 1 steam flood, 1 water flood, and 3 more water disposal project and well files for our review. We may select others for review at random. I will also be looking at your inspection logs and follow up enforcement actions.

I appreciate your cooperation in preparing for the review. I look forward to visiting your district office.

Sincerely,

Janet Y. Hashimoto

Janet Y. Hashimoto
CDOG Project Officer

Enclosures

cc: M. G. Mefferd, CDOG Sacramento

CHECKLIST FOR FILE REVIEW: PROJECT FILE

Project Operator: Class/Type:

Field Name:

Formation/Zone:

No. of Wells in Project:
_____ Proposed
_____ Active
_____ Temp. Abandoned
_____ Perm. Abandoned
_____ TOTAL

PROJECT PLAN Date Submitted: _____
_____ Notification to Neighboring Operators

Engineering Study:
_____ Purpose of Project
_____ Reservoir Characteristics of Each Injection Zone
_____ Reservoir Fluid Data for Each Injection Zone
_____ Casing Diagrams and Plugging Information on All Wells in Area of Review
_____ Planned Well-drilling and Abandonment Program to Complete Project

Geologic Study:
_____ Structural Contour Map and Isopach
_____ Cross-section through at Least One Injection Well
_____ Representative E-log that Identifies All Geologic Units, Formations, Fresh Water Aguifers, and Oil or Gas Zones

Injection Plan:
_____ Map Showing All Wells Within Area of Review that Penetrate Injection Zone
_____ Schematic of Surface and Subsurface Injection Facilities
_____ Anticipated Injection Pressure and Volume (Daily Rate)
_____ Monitoring Systems
_____ Method of Injection
_____ Corrosion Protective Measures
_____ Source and Analysis of Injection Fluid
_____ Location and Depth of Each Water Source Well Used for Project

Additional Information:

CHECKLIST FOR FILE REVIEW: WELL FILE

Well Name/Number:

Schematic on back should show:

_____ Base of Fresh Water
_____ Surface Casing
_____ Injection String
_____ Liner
_____ Packer
_____ Cement
_____ Injection Intervals (Perfs.)

New or Conversion?

Date Notice of Intent to Drill, Redrill, Deepen, or Rework Submitted: _____

Date P-report Issued (Approval Given) for Injection: _____

Step Rate Test Run? Y / N
Date: _____
Witnessed? Y / N
Outcome:

Initial MIT (or Fluid Injection Survey)
Date: _____
Type of Test (RAT, Spinner, Temp.): _____
Witnessed? Y / N
Outcome

Subsequent MITs
Dates: _____
Witnessed? Y / N
Outcome

Compliance/Enforcement/Violations:

CLASS II & OILFIELD CLASS V
INJECTION WELL DATA
FILE REVIEW CHECK LIST

EPA UIC REGION 9

February 1987 DRAFT

Operator _____ Field _____

Date of Review _____ Well _____

Reviewer _____ Injection Formation _____

Location _____

Well Class & Type _____

GENERAL INVENTORY INFORMATION

___ 1) Facility Name, address

___ 2) Owner Name, address

___ 3) Operator/legal contact name, address (if different from above)

___ 4) Project type _____

___ 5) Operating status of injection well(s)
proposed _____ temporarily abandoned _____ total _____
active _____ permanently abandoned _____

___ 6) Listing of all permits or construction approvals

INSPECTION SCHEDULE

___ 1) Frequency _____

___ 2) Date of last inspection _____

MONITORING PROGRAM

___ 1) MIT frequency: annually, 2 yrs, 3 yrs, _____

___ 2) Mechanical integrity monitoring/reporting program

___ 3) Last MIT, pass or fail? Note any problems: _____
_____
_____

OPERATING DATA AND INJECTION PROCEDURES

___ 1) Injection rate (ave., max.) _____ bbl/d or gpm

___ 2) Injection pressure (ave., max) _____ bbl/d or gpm

___ 3) Annular fluid (type, volume, additives, pressure, density/specific gravity) type: _____

___ 4) Proposed injection procedures (indicate tubing with or without packer)

___ 5) Injection Fluid Characteristics - indicate if analysis is for current waste stream; if not, when will new analysis be completed: _____

___ A) Narrative description of individual waste streams
___ B) Mix ratio (ave., max., daily) of waste streams
___ C) Cumulative analysis of commingled injectate
___ D) Chemical analysis: TDS _____; Sodium _____; Chloride _____; Calcium _____; Sulfate _____; Any significant constituents _____

___ E) Compatibility of waste stream(s) with receiving formation, well components, and other waste streams

___ 6) Source of water (e.g., produced, facility supply well, municipal supply) _____

CONSTRUCTION DETAILS

___ 1) Schematic design (both well-head and subsurface details)

___ 2) Tubing

___ 3) Packer (and other down hole tools)

___ 4) Well completion (screened, perforated, tubing & packer)

___ 5) Internal and external pressures, axial loading

___ 6) Injection interval (depths) _____

AREA OF REVIEW METHODS

___ 1) Fixed radius method (quarter mile or half mile)

___ 2) Potential impact of injection upon wells within Area of Review (e.g., due to pressure build-up or volumetric displacement)

FORMATION TESTING PROGRAM

___ 1) Analysis of representative formation water sample:
TDS _____; Density/ specific gravity _____; Temp _____;
Sodium _____; Chloride _____; Calcium _____;
Sulfate _____; Etc _____
_____

___ 2) Salinity (TDS) profiles

___ 3) Results of, or proposed, injectivity testing

___ 4) Date injectivity test planned _____ completed _____

___ 5) Hydrogeology of Confining Zone

___ A) Thickness - _____
___ B) Age - _____
___ C) Lithology - _____
___ D) Mineralogy
___ E) Structure (presence of faults, fractures, or cavities)
___ F) Description of vertical and lateral continuity (e.g., depositional environment, facies changes, unconformities, and vertical and lateral extent of clay layers)
___ G) Hydrologic parameters:
___ i) hydraulic conductivity or permeability - _____
___ ii) porosity - _____
___ iii) oil/water saturation - _____
___ iv) compressibility - _____
___ v) formation fracture pressure, from testing or calculations - _____

___ 6) Hydrogeology of Injection Zone

___ A) Thickness - _____
___ B) Age - _____
___ C) Lithology - _____
___ D) Mineralogy
___ E) Structure (presence of faults, fractures, or cavities)
___ F) Description of vertical and lateral continuity (e.g., depositional environment, facies changes, unconformities, presence of clay layers/lenses)
___ G) Hydrologic parameters:
___ i) hydraulic conductivity or permeability - _____
___ ii) porosity - _____
___ iii) reservoir pressure - _____
___ iv) storage coefficient - _____
___ v) oil/water saturation - _____
___ vi) compressibility - _____
___ vii) formation fracture pressure, from testing or calculations - _____

MAPS OF WELLS/AREA AND AREA OF REVIEW

___ 1) Topographic Map: U.S.G.S. Quadrangle sheet as Base Map (maps should extend a minimum of one mile beyond the property boundaries)
- ___ A) Surface facilities
- ___ B) Project area
- ___ C) Public water supply facilities
- ___ D) Surface bodies of water, springs, mines, quarries, residences, roads, faults

___ 2) Topographic Map: showing all wells in project area (same scale as above)
- ___ A) Well I.D. (name and number)
- ___ B) Type (production, injection, irrigation, water supply, enhanced recovery, monitoring, abandoned, dry holes)

___ 3) Area of Review (topographic map showing well locations)
- ___ A) Quarter-mile radius
- ___ B) Half mile radius

___ 4) Surface Treatment Facilities
- ___ A) Process diagram (with descriptions of individual units)
- ___ B) Narrative description of treatment process and facility operation

MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA

___ 1) Geologic Maps
- ___ A) Local area
- ___ B) Regional setting

___ 2) Stratigraphic Column (local area)
- ___ A) Lithology of each formation
- ___ B) Mineralogy of injection and confining zones (if available)
- ___ C) Thickness of each formation
- ___ D) Hydraulic conductivity/permeability of injection and confining zones
- ___ E) Salinity profile (TDS)
- ___ F) 10,000 mg/l TDS baseline - depth _____
- ___ G) 3,000 mg/l TDS - depth _____
- ___ H) Geologic time scale

___ 3) Regional Geology (narrative description)

___ A) Regional structural geology
___ B) Regional stratigraphy
___ C) Seismic activity
___ D) Tectonic history

MAPS AND CROSS SECTIONS OF USDWs

___ 1) Geologic Cross-section(s)

___ A) Geologic formations
___ B) Structural features
___ C) TDS levels for each formation, list some values: _____
___ D) TDS level for injection zone only: _____ _____
___ E) Underground sources of drinking water _____
___ F) Injection zone _____
___ G) Confining zone

CORRECTIVE ACTION PLAN AND WELL DATA for all wells which penetrate the injection zone within the area of review

___ 1) Type of wells: production _____ injection _____ dry _____
irrigation _____ water supply _____ water flood _____

___ 2) Well depths, ranges: _____

___ 3) Status, number: active _____ inactive _____
temporarily abandoned _____ permanently abandoned _____
plugged _____ proposed _____ dry _____

___ 4) Legal contact(s) (name and address)

___ 5) Date drilled (plus dates of significant workovers)

___ 6) Construction information (e.g., cement, casing, tubing, completion type, and plugging records)

___ 7) Perforated interval(s)

___ 8) Location (township, range, section)

___ 9) Distance from injection well

__ 10) Corrective/remedial action for improperly plugged wells
date completed _____ date planned _____

__ 11) History of injection operations (existing wells only)

PLANS FOR WELL FAILURES OR SHUT-INS

___ 1) Outline of contingency plans

STIMULATION PROGRAM

___ 1) Outline of proposed, or results of, stimulation program, does it include types of fluids used, volumes of fluids, and frequency of stimulation? _____

CONSTRUCTION PROCEDURES

___ 1) Drilling/Construction plan or well history

___ 2) Casing program (including thickness, diameter, nominal weight, joint specifications, lengths)

___ 3) Cementing program (quantity, location, additives, grade)

___ 4) Annular fluid type _____

___ 5) Deviation checks

___ 6) Logging program

___ A) Listing of logs/tests run on well and dates

_____

_____

_____

___ B) Lithologic logs

GENERAL COMMENTS:

KEY

- present or addressed

NA - not available

N/A - not applicable

Note: Please do not leave the first columns blank, use one of the symbols above or use something else self-explanatory.